



The Scheduling of Kratom and Selective Use of Data

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ABSTRACT

Kratom is a traditional drug from Southeast Asia that has been an emerging new substance in the United States. On August 30, 2016, the DEA announced the intention to emergency schedule kratom into Schedule I. To support this decision, the DEA cited an increase in drug seizures of kratom and an increase in calls to poison control concerning kratom. However, a short time later, on October 12, 2016, the DEA withdrew the intent to schedule kratom after public and congressional backlash. The withdrawal by the DEA was somewhat unprecedented. To better understand both decisions, the current article examines the evidence the DEA cited to support their decision to emergency schedule kratom and the degree and type of media coverage of kratom to determine if a media-driven drug panic occurred.

ARTICLE HISTORY

Received 26 February 2017
Revised 10 June 2017
Accepted 29 June 2017

KEYWORDS

Controlled Substances Act;
Drug Enforcement
Administration; drug panic;
kratom

Since the passage of the Controlled Substances Act in 1970 (CSA), the process of drug scheduling has been debated in the scientific community. The original design of the scheduling process was intended to be scientific. Indeed, eight factors¹ are listed for these scientific decisions (Courtwright 2004; Spillane 2004). Yet, two events have cast some measure of doubt on the intended objective scientific analysis of these decisions. First, the Drug Enforcement Administration (DEA), a law enforcement agency with a law enforcement agenda, is responsible for making scheduling decisions. Second, in 1984, as part of the Comprehensive Crime Control Act, the Attorney General of the United States (U.S.) was empowered to place drugs into Schedule I on an emergency basis. In 1990, the Attorney General delegated this power to the DEA (Griffin 2014). Some scheduling decisions have resulted in the placement of drugs in Schedule I despite documented medical utility. Examples of this include MDMA (Griffin 2012; Rosenbaum and Doblin 1991; Smith 2007), GHB (Griffin 2012; Nicholson and Balster 2001), and marijuana (Hoffmann and Weber 2010; Pacula et al. 2002). Perhaps the greatest reason that placing a substance into Schedule I is so consequential is that such a decision essentially halts all use of the drug and makes research extremely difficult (Griffin, Miller, and Khey 2008; Jaffe 1985). While some people have decried certain scheduling decisions, Coulson and Caulkins (2012) have argued that, while a few scheduling

decisions seem dubious, overall the process seems to work. One of the biggest reasons that this process can lead to disagreements is the many different ways that harm is calculated (Caulkins, Reuter, and Coulson 2011; Nutt et al. 2007). In the latter half of 2016, a controversy arose surrounding the scheduling of yet another drug—kratom.

Kratom

Kratom is a substance that comes from the Korth tree. The plant is native to Africa and Southeast Asia, although it is predominantly found in Malaysia and Thailand. Included within the leaves of the plant are more than 20 alkaloids, many of which contain psychoactive properties (Jansen and Prast 1988). The primary psychoactive alkaloid of the plant is mitragynine, a partial opioid agonist, which has approximately one-fourth the potency of morphine. Occurring in much rarer volumes is another alkaloid, 7-hydroxymitragynine (7-OH). Although found in less frequency than mitragynine, 7-OH is approximately 10 times as potent as morphine (Babu, McCurdy, and Boyer 2008; Kitajima et al. 2006).

The first mention of kratom in the scientific literature was in 1836, when it was noted that kratom could be used as an opium substitute (Jansen and Prast 1988). Taking this into consideration, it is unsurprising that

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the use of kratom can cause dependency and withdrawal. Singh, Müller, and Vicknasingam (2014) found, among kratom users they surveyed in Malaysia, 45% of 293 regular users had signs of moderate dependence. However, the withdrawal symptoms of kratom appear milder than opiates (Boyer et al. 2008). Indeed, as Singh, Müller, and Vicknasingam (2014) have indicated, users of kratom only report small impairments in social functioning. Kratom has several different routes of administration, which include smoking or chewing the leaves of the plant, brewing the leaves into a tea, ingesting powdered leaves into capsule or pill form, and making a kratom extract into a liquid dose (Hassan et al. 2013). One of kratom's unique characteristics is that smaller amounts produce stimulant effects while larger amounts produce effects similar to opiates (Babu, McCurdy, and Boyer 2008; Hassan et al. 2013; Jansen and Prast 1988; Kikura-Hanajiri et al. 2009; Rosenbaum, Carreiro, and Babu 2012; Scott, Yeakel, and Logan 2014).

Traditional use of kratom

Kratom has been used in traditional indigenous medicine in Southeast Asia for years for the treatment of a variety of maladies, including malaria, cough, hypertension, diarrhea, depression, analgesia, and fever reduction (Griffin, Daniels, and Gardner 2016; Jansen and Prast 1988; Prozialeck 2016). Additionally, many people have noted that kratom has the potential to treat opiate abuse, a serious current problem in the U.S. (Boyer et al. 2008; Jansen and Prast 1988; Prozialeck 2016; Rosenbaum, Carreiro, and Babu 2012; Saingam et al. 2013; Swogger et al. 2015). Yet, as McIntyre et al. (2015) noted, the pharmacological properties of kratom and its potential toxicity are not completely clear. While kratom can produce negative side-effects, kratom seems primarily dangerous when users engage in polydrug use (Boyer et al. 2008; Cinosi et al. 2015; McIntyre et al. 2015; Nelsen et al. 2010; Prozialeck 2016; Rosenbaum, Carreiro, and Babu 2012). Indeed, Kronstrand et al. (2011) documented deaths associated with Krypton, a substance that combined kratom with O-Desmethylnaloxone. Furthermore, Karinen et al. (2014) discussed the death of a Norwegian man who had traces of mitragynine, 7-OH, Zopiclone, citalopram, and lamotrigine in his system. The fear of an unregulated marketplace and the potential of drug mixing with kratom can pose dangers to kratom users (Philipp et al. 2009). That being said, cases of death resulting from kratom seem rare, with only one documented case in the literature (Karinen et al. 2014). A recent report noted that mitragynine levels appeared at varying levels in two reported deaths, yet kratom was

not responsible for either death (Domingo et al. 2017). However, since kratom is sold in the U.S. with few regulations, there is a perception by many that the use of kratom is safe, and there have been several reports of self-medication without medical consultation (Boyer et al. 2008, 2007).

Regulation of kratom

Both the Thai and Malaysian governments regulate kratom. In Thailand, kratom was placed in Schedule 5 of the Thai Narcotics Act. In Malaysia, kratom is listed in the Poison Act (Hassan et al. 2013). Despite this regulation, kratom use is still found in these countries. According to Ahmad and Aziz (2012), 88% of the 562 kratom users they surveyed used on a daily basis. In addition to Thailand and Malaysia, Bhutan, Finland, Lithuania, Denmark, Poland, Sweden, Australia, and Myanmar all control or regulate kratom (Hassan et al. 2013).

Prior to 2016, within the U.S., only five states controlled kratom, and the DEA listed kratom only as a drug of concern (Griffin, Daniels, and Gardner 2016). Additionally, media reports of kratom use were sporadic and, for the most part, were confined to blogs and websites selling kratom. That began to change on July 29, 2016, with a report disseminated by the Centers for Disease Control and Prevention (CDC). Within that report, Anwar and Schier (2016) noted that, during the time period of 2010 to 2015, poison control centers in the U.S. received 660 calls related to kratom exposures. Previous years documented lower numbers (ranging from 26 in 2010 to 263 in 2015). Based upon these numbers, the authors stated that kratom use seemed to be increasing within the U.S. and that public and healthcare providers should be aware of the potential dangers associated with the adverse effects of kratom.

The profile of kratom within the American consciousness was raised again on August 30, 2016. On that day, the DEA announced its intention to place the chemicals mitragynine and 7-hydroxymitragynine into Schedule I of the CSA. In the statement of the DEA, the agency reiterated a common controversial claim espoused by the agency to place the substance in Schedule I—that kratom had no accepted medical use and a high potential for abuse. Claims by the DEA of this kind are not new, and evidence is available to challenge such claims. In addition to the claims of danger and a lack of medical utility, the DEA offered two other pieces of evidence to support the claim that it was necessary to emergency schedule kratom. The first was the aforementioned CDC report. The second was that, from February 2014 to July 2016, U.S. law enforcement organizations seized 55,000 kilograms of kratom material during law enforcement

activities. Another 57,000 kilograms were confiscated during importation into the U.S. (during the time period of 2014 through 2016) and were awaiting an admissibility decision from the Food and Drug Administration (FDA).

Once the DEA intends to schedule a drug, the agency usually follows through on those plans. Yet, something different happened with kratom. Many advocacy groups, such as the American Kratom Association (AKA) and the Drug Policy Alliance (DPA), protested the decision. A White House petition received more than 140,000 signatures requesting that kratom not be placed into Schedule I (Hadley 2016). Furthermore, a bipartisan group of 51 members of the House of Representatives wrote a letter to the acting administrator of the DEA, urging that the emergency scheduling decision be delayed until more evidence could be obtained to ascertain if such an action was warranted (Wing 2016). This confluence of events seemed to catch the DEA off-guard. Originally, the scheduling of kratom was supposed to take effect by September 30, but on October 12, the DEA withdrew the intent to schedule notice from the federal register and the agency stated that it would gather more input from interested parties before making any further decisions (Hadley 2016). To date, the DEA has still not acted.

One common phenomenon associated with drug regulations is media panics associated with various drugs. These stories typically involve sensationalized reports that can range from embellishing the dangers of drugs to the creation of outright mythology. Perhaps the most common example of such a panic was that created by Harry Anslinger regarding marijuana during the 1930s. Anslinger told fantastic tales regarding the ability of marijuana to turn its users into various forms of mentally ill and violent offenders (Becker 1963; Bonnie and Whitebread 1999; Griffin et al. 2013; Himmelstein 1983). More recent drug panics have involved crack-cocaine (Reinarman and Levine 1997), various so-called designer drugs, a seeming catch-all category for many prescription or synthetic drugs (Jenkins 1999; Rosenbaum, Carreiro, and Babu 2012), methamphetamine (Armstrong 2007; Linnemann and Wall 2013), and bath salts (mephedrone) (Rosenbaum, Carreiro, and Babu 2012; Stogner and Miller 2013). As Miller et al. (2015) recently noted, many drug panics have not only exaggerated the harm caused by these drugs, but media panics are typically short-lived. Yet, it does not seem that kratom has followed the typical trajectory of a drug panic, and there is scant evidence of media coverage before the DEA announced an intention to schedule kratom.

Methods

The current study has two main purposes. First, we compare drug seizures and poison control calls concerning kratom to other drug seizures made and the number of calls to poison control centers for not only other drugs, but a few other substances as well. In doing so, we hope to put the statistics released by the DEA into greater context. Second, we seek to document how much media coverage existed before the CDC report and after the announcement of the DEA of their intention to schedule kratom. Researchers have documented how government agencies have perpetuated drug panics through the media, but the question regarding kratom is whether there was much media coverage beyond discussing the actions of the DEA.

In order to make comparisons between seizures of kratom material, data were obtained from two sources. The first was the DEA database System to Retrieve Information from Drug Evidence (STRIDE), which reports drug materials sent to the DEA for laboratory analysis (from both state and federal law enforcement agencies). The second source of data was the Federal-wide Drug Seizure System (FDSS), a database that compiles drug seizures from all federal agencies including the Federal Bureau of Investigation (FBI), DEA, and the U.S. Customs Service (USCS), Border Patrol, and Coast Guard. In order to make comparisons between the number of calls to poison control regarding kratom, data were gathered from the National Capital Poison Center (NCPC). The organization collects data from 55 poison control centers in the U.S. NCPC distributes this data as well as reports warning the U.S. public of the dangers of various substances. These data were obtained from a publication by Mowry et al. (2015).

To analyze the media coverage concerning kratom, two sources were used: Google News and LexisNexis. The word "kratom" was typed into both databases with a date range of June 29 to October 31. We wanted to document the number of articles that were available during that time frame (one month before the CDC report was released to two weeks after the DEA made the announcement to withdraw the intent to schedule kratom). Google News was chosen for its breadth of coverage (in addition to traditional media, several other pages came up including blogs, message boards, treatment information, and websites selling kratom) and LexisNexis, since it has a narrower focus that sometimes omits newer formats of media coverage (for example, *The Huffington Post* was not obtained from a LexisNexis search).

Results

The DEA reported two different amounts of kratom seized (55,000 kilograms seized over a two and one-half year period by law enforcement and 57,000 kilograms seized over a two and one-half year period that was imported and awaiting FDA admissibility). Adding both amounts together, this accounts for roughly 44,800 kilograms seized per year. For the first comparison, the amount of kratom seized is compared to other reported drug seizures as listed in the STRIDE database. For a second comparison of drug seizures, data were taken from FDSS.

As shown in Table 1, the amount of kratom seized is far more than heroin and methamphetamine in both databases, more than cocaine seizures in STRIDE, but less than cocaine seizures in the FDSS. The amount of kratom seized was about one-sixth the amount of marijuana seized in STRIDE, and approximately 1/44 of the amount of marijuana seized in the FDSS.

According to the CDC report, during the time period of 2010 to 2015, U.S. poison control centers received 660 calls related to kratom exposures. The poison control center calls ranged from 26 in 2010 to 263 in 2015. For comparison purposes, the number of poison control calls for 2014 (the most recent available data) for kratom are compared to the number of calls for many different substances.

To illustrate the findings of the Google News search and the LexisNexis news search, Table 3 and Figure 1 were created. When looking at the table and figure, four dates are important to keep in mind: (1) July 29, when the CDC report was disseminated; (2) August 30, when the DEA made the announcement of their intent to emergency schedule kratom; (3) September 30, when kratom was originally supposed to be placed into Schedule I of the CSA; and (4) October 12, when the DEA withdrew the notice of emergency scheduling.

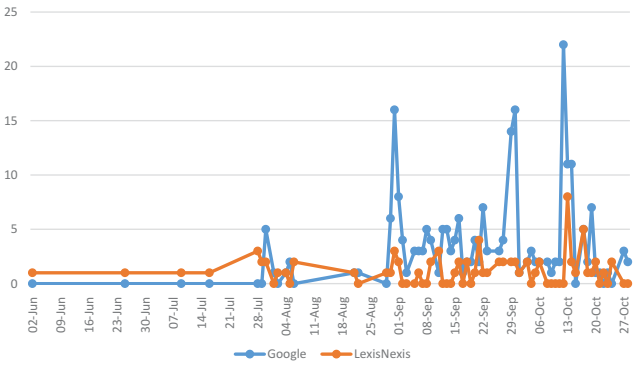


Figure 1. Articles discussing kratom. Data were obtained through a Google News and LexisNexis search of kratom.

Discussion

Comparisons of drug seizure data are somewhat difficult. Clearly, much more marijuana was seized than kratom, but one would expect this, considering that marijuana is the most consumed recreational drug in the U.S. behind alcohol. The amount of kratom compared to cocaine, heroin, and methamphetamine may seem compelling on its face, but when it is analyzed in more detail, these results appear more mundane. Cocaine and heroin enter the U.S. as powder that is meant to be snorted, smoked, or injected, and methamphetamine is either in crystal or powder form that can be administered in any one of the three aforementioned routes. Kratom can be ingested in a variety of forms, but the drug can be frequently imported as plant matter. Thus, kratom seems likely to naturally weigh more than many other types of drugs. While the DEA did claim, in its initial intent to schedule, that the amount of kratom seized represented 12 million doses of the drug, it is hard to take this claim at face value for two reasons. First, the DEA gives no indication of what types of kratom (e.g., plant material, powder, capsules) were seized to produce this many doses. The second reason is that, considering how novel kratom is to the

Table 1. Drug seizures from drug seizure system and reported from STRIDE.

Year	Drug							
	Cocaine		Heroin		Marijuana		Methamphetamine	
	STRIDE ¹	Federal ²	STRIDE	Federal	STRIDE	Federal	STRIDE	Federal
2013	24,103	—	1,044	—	270,823	—	4,227	—
2012	36,736	—	1,010	—	388,064	—	4,813	—
2011	32,151	—	1,077	—	575,972	—	2,561	—
2010	30,061	62,646	713	2,833	725,862	1,969,703	2,224	10,098
2009	50,705	58,085	622	2,245	671,650	2,012,800	2,129	6,526
2008	—	48,471	—	1,870	—	1,486,855	—	6,242
2007	—	56,687	—	1,651	—	1,741,875	—	6,029
2006	—	64,935	—	2,001	—	1,294,159	—	5,815

The DEA reported (from February 2014 to July 2016) that law enforcement organizations seized 55,000 kilograms of kratom and 57,000 kilograms were confiscated during importation into the United States and awaited an admissibility determination by the FDA.

¹Data retrieved from STRIDE: <https://www.dea.gov/resource-center/statistics.shtml#seizures>. All values in kilograms.

²Note: Data retrieved from Federal-wide Drug Seizure System: www2.census.gov/library/publications/.../12s0328.xls. Values were originally reported in pounds and were converted to kilograms.

U.S. and without any real indication of how widespread kratom use is in the U.S., 12 million doses seems a rather ambitious amount for people who are attempting to sell kratom in the U.S.

Data in Table 2 show that, although there is a one-year difference, the 263 calls for kratom would have represented roughly 0.000091% of all calls to poison control, a very small proportion. Comparatively, there were roughly 381.7 times as many calls for analgesics, there were approximately 195.2 times more calls for alcohol than kratom, and even 12.4 times more calls for battery ingestion than kratom. The average number of calls per month for kratom in 2015 was 21.9. Thus, at least from the poison control data, there did not seem much of a necessity for the emergency scheduling of kratom.

As shown in Table 3, in July, Google News did not have any media articles discussing kratom, and LexisNexis only produced eight articles. Neither was there much traffic on blogs, message boards, or treatment information. The most common search result for “kratom” was websites selling the substance. That began to change in August, when some increase occurred in media articles and the number of blogs more than doubled. This amount of coverage still appears modest. In September, the number of media articles increased dramatically and, once again, the number of blogs increased by more than half. During October, media attention decreased some, but was more than August coverage. The number of blog entries dipped slightly below August levels. Over time, the number of websites selling kratom seemed to

decrease. Although the information is interesting, a day-by-day breakdown of the number of media articles is particularly compelling.

As seen in Figure 1, there are roughly four peaks of kratom coverage. The first small peak is around the time of the CDC report. The second peak is around the time that the DEA announced the intention to schedule kratom. The third peak is around the time that the scheduling of kratom was supposed to take place. The fourth peak, which is the largest, was around the time that the DEA announced its intent to withdraw the scheduling of kratom. Separate from these events, media coverage of kratom seemed quite minimal. Thus, most of the media coverage was devoted to reporting the actions of the government regarding kratom. Certainly, the media seemed to supplement its coverage of kratom by talking to users of the drug and law enforcement, but separate from the government action, kratom did not seem to attract much media interest.

This study is not without limitations. First, media coverage of kratom may not be indicative of actual kratom use. Second, while two search engines were used, there are likely articles on kratom that were not included, particularly local and print-only news stories. Third, coverage of kratom was examined in a limited time frame for purposes of documenting the frequency of coverage in relation to two events (the CDC report and the DEA announcement). This time frame may have also omitted news coverage of kratom. Lastly, conclusions made from comparisons of different drug seizure amounts should be interpreted with caution.

Both the media coverage of drugs and the decisions to schedule various drugs have received attention from drug researchers. The rationale for scheduling drugs, and especially for the emergency scheduling of drugs, has generally been that a dangerous substance is available to citizens who may eventually be harmed unless the government takes quick and decisive action. Yet, in the case of kratom, the DEA did not seem to have much evidence to support such a claim. The poison control data illustrated that only a miniscule percentage of poison control calls involved kratom (even with the reported increase), and the drug seizure numbers were not contextualized beyond an estimate of the number of doses potentially available to the public. A familiar DEA claim was made—that kratom lacked any recognized medicinal value; however, such a claim deserves scrutiny. The DEA has a history of claiming that certain drugs lack medical utility. Indeed, the cases of marijuana and MDMA are particularly relevant. Furthermore, the DEA ignored that kratom had been used in traditional medicine in Southeast Asia for

Table 2. 2015 selected poison control reports.

Total Calls	2,792,130
Human poison exposures	2,168,371
Analgesics	287,843
Cleaning substances (household)	195,974
Cosmetics/personal care products	192,596
Sedative/hypnotics/antipsychotics	151,433
Antidepressants	118,812
Antihistamines	105,457
Cardiovascular drugs	103,339
Alcohols	70,218
Battery ingestion	9,104
Kratom	263

Note: Data taken from 2015 Annual Report of the American Association of Poison Control Centers' National Poison Data System (NPDS): 33rd Annual Report.

Table 3. Media references to kratom.

Media Type	July	August	September	October
Google articles	0	10	113	83
LexisNexis articles	8	10	28	29
Websites selling kratom	31	25	23	17
Blogs	24	51	128	46
Message boards	10	6	6	0
Treatment information	5	6	5	5

hundreds of years. Considering that the U.S. is currently experiencing an opioid epidemic, it would seem that a law enforcement agency would look for alternatives to opiates that might have less abuse potential. What seems unusual in this case is that the DEA backed away from its plan to schedule a drug. Perhaps the lack of media coverage of the alleged danger that kratom would spawn did not provide the DEA with sufficient mandate to continue the emergency scheduling of kratom. What may have been the real catalyst is that Congress, which controls the DEA operating budget, stepped in. To date, the case of kratom is still incomplete. Given the medicinal properties of the substance and the evidence of dependence, it seems likely that kratom will end up in some schedule within the CSA. What is most unique about the case of kratom is that the DEA took action and then backed off.

Notes

1. The eight factors are: (1) actual or relative potential for abuse; (2) scientific evidence of the pharmacological effects; (3) the state of current scientific knowledge regarding the substance; (4) history of the substance and current pattern of abuse; (5) the scope, duration, and significance of abuse; (6) risk to public health; (7) psychic or physiological dependence liability; and (8) if the substance is an immediate precursor to a substance that has already been scheduled.

References

- Ahmad, K., and Z. Aziz. 2012. *Mitragyna speciosa* use in the northern states of Malaysia: A cross-sectional study. *Journal of Ethnopharmacology* 141 (1):446–50. doi:10.1016/j.jep.2012.03.009.
- Anwar, M., and J. Schier. 2016. Notes from the field: Kratom (*Mitragyna speciosa*) exposures reported to poison centers: United States, 2010–2015. *Morbidity and Mortality Weekly Report* 65:748–49. doi:10.15585/mmwr.mm6529a4.
- Armstrong, E. G. 2007. Moral panic over meth. *Contemporary Justice Review* 10 (4):427–42. doi:10.1080/10282580701677519.
- Babu, K. M., C. R. McCurdy, and E. W. Boyer. 2008. Opioid receptors and legal highs: *Salvia divinorum* and kratom. *Clinical Toxicology* 46 (2):146–52. doi:10.1080/15563650701241795.
- Becker, H. S. 1963. *Outsiders: Studies in the sociology of deviance*. New York, NY: The Free Press.
- Bonnie, R. J., and C. H. Whitebread. 1999. *The marijuana conviction: A history of marijuana prohibition in the United States*, 2nd ed. New York, NY: The Lindesmith Center.
- Boyer, E. W., K. M. Babu, J. E. Adkins, C. R. McCurdy, and J. H. Halpern. 2008. Self-treatment of opioid withdrawal using kratom (*Mitragyna speciosa* korth). *Addiction* 103 (6):1048–50. doi:10.1111/add.2008.103.issue-6.
- Boyer, E. W., K. M. Babu, G. E. Macalino, and W. Compton. 2007. Self-treatment of opioid withdrawal with a dietary supplement, kratom. *American Journal on Addictions* 16 (5):352–56. doi:10.1080/10550490701525368.
- Caulkins, J. P., P. Reuter, and C. Coulson. 2011. Basing drug scheduling decisions on scientific ranking of harmfulness: False promise from false premises. *Addiction* 106 (11):1886–90. doi:10.1111/j.1360-0443.2011.03461.x.
- Cinisi, E., G. Martinotti, P. Simonato, D. Singh, Z. Demetrovics, A. Roman-Urrestarazu, F. S. Bersani, B. Vicknasingam, G. Piazzon, J.-H. Li, W.-J. Yu, M. Kapitány-Fövény, J. Farkas, M. Di Giannantonio, and O. Corazza. 2015. Following “the roots” of kratom (*Mitragyna speciosa*): The evolution of an enhancer from a traditional use to increase work and productivity in Southeast Asia to a recreational psychoactive drug in Western countries. *BioMed Research International*. doi:10.1155/2015/968786.
- Coulson, C., and J. P. Caulkins. 2012. Scheduling of newly emerging drugs: A critical review of decisions over 40 years. *Addiction* 107 (4):766–73. doi:10.1111/add.2012.107.issue-4.
- Courtwright, D. T. 2004. The Controlled Substances Act: How a “big tent” reform became a punitive drug law. *Drug and Alcohol Dependence* 76 (1):9–15. doi:10.1016/j.drugalcdep.2004.04.012.
- Domingo, O., G. Roider, A. Stöver, M. Graw, F. Musshoff, H. Sachs, and W. Bicker. 2017. Mitragynine concentrations in two fatalities. *Forensic Science International* 271:e1–e7. doi:10.1016/j.forsciint.2016.12.020.
- Griffin, O. H. 2012. Is the government keeping the peace or acting like our parents? Rationales for the legal prohibitions of GHB and MDMA. *Journal of Drug Issues* 42 (3):247–62. doi:10.1177/0022042612456014.
- Griffin, O. H. 2014. The role of the United States Supreme Court in shaping federal drug policy. *American Journal of Criminal Justice* 39 (3):660–79. doi:10.1007/s12103-013-9224-4.
- Griffin, O. H., J. A. Daniels, and E. A. Gardner. 2016. Do you get what you paid for? An examination of products advertised as kratom. *Journal of Psychoactive Drugs* 48 (5):330–35. doi:10.1080/02791072.2016.1229876.
- Griffin, O. H., A. L. Fritsch, V. H. Woodward, and R. S. Mohn. 2013. Sifting through the hyperbole: One hundred years of marijuana coverage in The New York Times. *Deviant Behavior* 34 (10):767–81. doi:10.1080/01639625.2013.766548.
- Griffin, O. H., B. L. Miller, and D. N. Khey. 2008. Legally high? Legal considerations of *Salvia divinorum*. *Journal of Psychoactive Drugs* 40 (2):183–91. doi:10.1080/02791072.2008.10400629.
- Hadley, G. 2016. What made the DEA change its mind about banning a drug for heroin addiction? Miami Herald. <http://www.miamiherald.com/news/nation-world/national/article107741147.html> (accessed January 6, 2017).
- Hassan, Z., M. Muzaimi, V. Navaratnam, N. H. M. Yusoff, F. W. Suhaimi, R. Vadivelu, B. K. Vicknasingam, D. Amato, S. Von Hörsten, N. I. W. Ismail, N. Jayabalan, A. I. Hazim, S. M. Mansor, and C. P. Muller. 2013. From kratom to mitragynine and its derivatives: Physiological and behavioural effects related to use, abuse, and addiction. *Neuroscience & Biobehavioral Reviews* 37 (2):138–51. doi:10.1016/j.neubiorev.2012.11.012.
- Himmelstein, J. L. 1983. *The strange career of marihuana: Politics and ideology of drug control in the United States*. Westport, CT: Greenwood Press.

- Hoffmann, D. E., and E. Weber. 2010. Medical marijuana and the law. *New England Journal of Medicine* 362 (16):1453–57. doi:10.1056/NEJMp1000695.
- Jaffe, J. H. 1985. Impact of scheduling on the practice of medicine and biomedical research. *Drug and Alcohol Dependence* 14 (3–4):403–18. doi:10.1016/0376-8716(85)90070-5.
- Jansen, K. L. R., and C. J. Prast. 1988. Psychoactive properties of mitragynine (kratom). *Journal of Psychoactive Drugs* 20 (4):455–57. doi:10.1080/02791072.1988.10472519.
- Jenkins, P. 1999. *Synthetic panics: The symbolic politics of designer drugs*. New York, NY: NYU Press.
- Karinen, R., J. T. Fosen, S. Rogde, and V. Vindenes. 2014. An accidental poisoning with mitragynine. *Forensic Science International* 245:e29–e32. doi:10.1016/j.forsciint.2014.10.025.
- Kikura-Hanajiri, R., M. Kawamura, T. Maruyama, M. Kitajima, H. Takayama, and Y. Goda. 2009. Simultaneous analysis of mitragynine, 7-hydroxymitragynine, and other alkaloids in the psychotropic plant “kratom” (*Mitragyna speciosa*) by LC-ESI-MS. *Forensic Toxicology* 27 (2):67–74. doi:10.1007/s11419-009-0070-5.
- Kitajima, M., K. Misawa, N. Kogure, I. M. Said, S. Horie, Y. Hatori, T. Murayama, and H. Takayama. 2006. A new indole alkaloid, 7-hydroxyspeciociliatine, from the fruits of Malaysian *Mitragyna speciosa* and its opioid agonistic activity. *Journal of Natural Medicines* 60 (1):28–35. doi:10.1007/s11418-005-0001-7.
- Kronstrand, R., M. Roman, G. Thelander, and A. Eriksson. 2011. Unintentional fatal intoxications with mitragynine and O-desmethyltramadol from the herbal blend Krypton. *Journal of Analytical Toxicology* 35 (4):242–47. doi:10.1093/anatox/35.4.242.
- Linnemann, T., and T. Wall. 2013. “This is your face on meth”: The punitive spectacle of “white trash” in the rural war on drugs. *Theoretical Criminology* 17 (3):315–34. doi:10.1177/1362480612468934.
- McIntyre, I. M., A. Trochta, S. Stolberg, and S. C. Campman. 2015. Mitragynine “Kratom” related fatality: A case report with postmortem concentrations. *Journal of Analytical Toxicology* 39 (2):152–55. doi:10.1093/jat/bku137.
- Miller, B. L., J. M. Stogner, L. E. Agnich, A. Sanders, J. Bacot, and S. Felix. 2015. Marketing a panic: Media coverage of novel psychoactive drugs (NPDs) and its relationship with legal changes. *American Journal of Criminal Justice* 40 (3):523–41. doi:10.1007/s12103-014-9270-6.
- Mowry, J. B., D. A. Spyker, D. E. Brooks, N. McMillan, and J. L. Schauben. 2015. 2014 Annual Report of the American Association of Poison Control Centers’ National Poison Data System (NPDS): 32nd Annual Report. *Clinical Toxicology* 53 (10):962–1147. doi:10.3109/15563650.2015.1102927.
- Nelsen, J. L., J. Lapoint, M. J. Hodgman, and K. M. Aldous. 2010. Seizure and coma following kratom (*Mitragyna speciosa* Korth) exposure. *Journal of Medical Toxicology* 6 (4):424–26. doi:10.1007/s13181-010-0079-5.
- Nicholson, K. L., and R. L. Balster. 2001. GHB: A new and novel drug of abuse. *Drug and Alcohol Dependence* 63 (1):1–22. doi:10.1016/S0376-8716(00)00191-5.
- Nutt, D., L. A. King, W. Saulsbury, and C. Blakemore. 2007. Development of a rational scale to assess the harm of drugs of potential misuse. *The Lancet* 369 (9566):1047–53. doi:10.1016/S0140-6736(07)60464-4.
- Pacula, R. L., J. F. Chriqui, D. A. Reichmann, and Y. M. Terry-McElrath. 2002. State medical marijuana laws: Understanding the laws and their limitations. *Journal of Public Health Policy* 23 (4):413–39. doi:10.2307/3343240.
- Philipp, A. A., D. K. Wissenbach, S. W. Zoerntlein, O. N. Klein, J. Kanogsunthornrat, and H. H. Maurer. 2009. Studies on the metabolism of mitragynine, the main alkaloid of the herbal drug kratom, in rat and human urine using liquid chromatography-linear ion trap mass spectrometry. *Journal of Mass Spectrometry* 44 (8):1249–61. doi:10.1002/jms.1607.
- Prozialeck, W. C. 2016. Update on the pharmacology and legal status of kratom. *The Journal of the American Osteopathic Association* 116 (12):802–09. doi:10.7556/jaoa.2016.156.
- Reinarman, C., and H. Levine. 1997. The crack attack. In *Crack in America: Demon Drugs and Social Justice*, ed. C. Reinarman and H. Levine, 18–51. Oakland, CA: University of California Press.
- Rosenbaum, C. D., S. P. Carreiro, and K. M. Babu. 2012. Here today, gone tomorrow and back again? A review of herbal marijuana alternatives (K2, Spice), synthetic cathinones (bath salts), kratom, salvia divinorum, methoxetamine, and piperazines. *Journal of Medical Toxicology* 8 (1):15–32. doi:10.1007/s13181-011-0202-2.
- Rosenbaum, M., and R. Doblin. 1991. Why MDMA should not have been made illegal. In *The drug legalization debate*, ed. J. A. Inciardi, 135–46. Newbury Park, CA: Sage Publications, Inc.
- Saingam, D., S. Assanangkornchai, A. F. Geater, and Q. Balthip. 2013. Pattern and consequences of kratom (*Mitragyna speciosa* Korth.) use among male villagers in southern Thailand: A qualitative study. *International Journal of Drug Policy* 24 (4):351–58. doi:10.1016/j.drugpo.2012.09.004.
- Scott, T. M., J. K. Yeakel, and B. K. Logan. 2014. Identification of mitragynine and O-desmethyltramadol in kratom and legal high products sold online. *Drug Testing and Analysis* 6 (9):959–63. doi:10.1002/dta.v6.9.
- Singh, D., C. P. Müller, and B. K. Vicknasingam. 2014. Kratom (*Mitragyna speciosa*) dependence, withdrawal symptoms and craving in regular users. *Drug and Alcohol Dependence* 139:132–37. doi:10.1016/j.drugalcdep.2014.03.017.
- Smith, J. 2007. The values and control of MDMA. *Contemporary Justice Review* 10 (3):297–306. doi:10.1080/10282580701526104.
- Spillane, J. F. 2004. Debating the Controlled Substances Act. *Drug and Alcohol Dependence* 76 (1):17–29. doi:10.1016/j.drugalcdep.2004.04.011.
- Stogner, J. M., and B. L. Miller. 2013. Investigating the “bath salt” panic: The rarity of synthetic cathinone use among students in the United States. *Drug and Alcohol Review* 32 (5):545–49.
- Swogger, M. T., E. Hart, F. Erowid, E. Erowid, N. Trabold, K. Yee, K. A. Parkhurst, B. M. Priddy, and Z. Walsh. 2015. Experiences of kratom users: A qualitative analysis. *Journal of Psychoactive Drugs* 47 (5):360–67. doi:10.1080/02791072.2015.1096434.
- Wing, N. 2016. Congress calls out DEA for unilateral move to expand the war on drugs. The Huffington Post. http://www.huffingtonpost.com/entry/congress-kratom-dea-letter_us_57e93743e4b0e28b2b54fe36 (accessed January 6, 2017).